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CASES
OF
SMALL - POX,
WHICH OCCURRED
IN THE ASYLUM FOR THE DEAF AND DUMB:
WITH AN ACCOUNT OF THE
RE-VACCINATION
OF ALL THE CHILDREN IN THAT ESTABLISHMENT.
READ BEFORE THE PHYSICAL SOCIETY,
BY DR. BABINGTON.

[Extracted from "Guy's Hospital Reports."]

FROM the numerous instances that have of late been observed, in which vaccination, performed at a distant period, has failed to afford protection against the contagion of small-pox, its efficacy has been made a subject of general doubt and inquiry; and it therefore seems incumbent on those who have the opportunity of recording facts or observations relative to this important question, to do so without reserve; in the hope that data may thus be furnished for coming to positive conclusions, as well regarding the degree of security afforded by vaccination, as the most eligible method of insuring it. The appearance of small-pox among the children at the Asylum for the Deaf and Dumb presented such an opportunity to myself: and as the cases that occurred exhibited some peculiarities, I proceed to give an account of them, as well as of the prophylactic measures which were in consequence adopted.

On my weekly visit to the Asylum, on Monday the 25th of February 1828, I found one lad, James Mitchell, aged 16, confined to his bed by an eruptive disorder. On a close examination of the skin, it appeared, on the face and forehead, thickly studded with red pimples, which were more sparingly scattered over the trunk and extremities. One or two on the ribs were beginning to fill with yellowish lymph, while the rest were merely elevated points. The patient had some cough, and complained of headache and uneasiness

at the pit of the stomach: his eyelids were red and swollen, and there was a peculiar brightness in his eyes, though he seemed drowsy and unwilling to keep them open: his skin was scarcely hotter than in health, and he had but little thirst: his tongue was white: his pulse 64, and rather full. I found, on inquiry, that he had been sent to the infirmary on Saturday evening, the 23d, with symptoms of general feverish indisposition. On the Sunday morning he had felt rigor, with headache and nausea, and was observed to be covered with an erythematous eruption; which gave rise, very naturally, to a supposition that he was the subject of measles. At the period when I first saw him, the erythema had somewhat faded; and I had a strong suspicion that the complaint would prove to be small-pox; although, from finding a very evident cicatrix on the arm, I was unwilling to state my opinion too positively. On inquiry, I learned that a girl who had lately returned to the establishment had been the subject of small-pox during the Christmas vacation, and thus afforded a probable source of contagion. On the following day, Tuesday 26th, at two in the afternoon, Mitchell's pulse was 72: his tongue was naked in the centre, and whitish at the sides: he still continued drowsy, and complained of pain in the head. He had some cough: his throat was sore; and, on inspection, was found studded with pustules; while the eruption in other parts also began to assume a more decidedly pustular appearance. All doubts were thus removed as to the nature of the affection; and a second case now appeared in the infirmary, namely, that of Charles Mogg, aged 15. This lad had suffered from headache and rigor on Saturday the 23d. On Sunday he was sick at stomach, feverish, and generally indisposed. On Monday, though still remaining in school, his face was much flushed, and an erythematous eruption made its appearance over the whole surface of his skin. On the Tuesday, when I first saw him, this general redness, accompanied by great heat, still remained; numerous pimples were just visible, as if under the skin, on the face, and more distinctly apparent on the body and limbs, not being so closely set in those parts. These pimples, though more isolated than those of measles, were yet scarcely larger than flea-bites; and, owing to the universal blush over the surface, were the less striking in colour. Three loose evacuations had been passed in the last twenty-four hours, and the patient had been twice sick in the morning. His pulse was 120: he was very thirsty, and had continued restless throughout the night. The cicatrix produced by vaccination was very evident.

Impressed with the severity of these two cases, which seemed to me to mark unusual virulence and activity in the contagious poison, and

having recently seen, in the adult members of one family in the neighbourhood of the Asylum, four severe cases of small-pox after vaccination, one of which proved fatal—not to mention many other instances—my attention was now directed to the means of preventing a further extension of the disorder among the healthy children; and none seemed so likely to prove effectual as that of re-vaccination. This, however, it was no very easy matter to accomplish; for healthy subjects, in a fit stage of the vaccine disease, are not to be met with at all times; and there is so much uncertainty attending the use of dried lymph, that justice would not have been done to the measure by its employment; besides which, our numbers were so great, as to require a larger supply of it than could be procured. Through the very kind and able assistance of my friend, Mr. Wheeler, the resident medical officer at the Small-pox Hospital, I was enabled to effect this important object, as will be seen hereafter.

On visiting the Asylum on Wednesday the 27th, Mitchell's state was as follows:—The tongue was not much coated: the pustules on the forehead were coherent, or aggregated in clusters: they were very numerous on the face also, but more sparingly scattered over the trunk and limbs: they were of a small sort, red, and filling, as speedily as could be desired, with transparent fluid. The patient had slept little during the night, but yet remained in a drowsy state, so that it seemed a trouble to him to raise his swollen eyelids. He suffered much pain on swallowing liquid, evidently from the progress of the pustules in the fauces: his tongue continued in the same state as the day before: his pulse 80: his bowels rather confined.

The report on Mogg this day was as follows:—Pulse 116, full, but not hard: tongue loaded with a thick white moist crust: eyes very heavy: had had no rest during the past night: the general erythema and heat of the surface rather increased: the pimples, remarked the day before on the face, now scarcely to be discovered; so that, had they not been previously observed, the skin would have been described as having only a mottled appearance: though very numerous on the body also, they were there generally indistinct.

The patient complained of much heat and thirst his throat, on inspection, was morbidly red, and he manifested pain on swallowing liquid; yet no pustules or ulcers were seen. The sickness at stomach had abated, but the headache was increased: three loose motions had been passed.

On Thursday 28th, at two o'clock, I met Mr. Wheeler at the Asylum, accompanied by eight healthy children with cow-pox, whose arms were in a fit condition to furnish excellent lymph. We proceeded therefore to re-vaccinate the whole establishment, consisting of 230 individuals. Mr. Wheeler's method of operating is, to insert lymph into ten punctured abrasions, ranged in two parallel lines down the arm, over the insertion of the deltoid, so as to occupy a space of about an inch and a half. By this increase in the number of punctures, the chance of failure is diminished, and an abundant supply of lymph is obtained; which is a matter of much importance at a public establishment for vaccination. The details of our experiment on the present occasion I have thought it worth while to exhibit in a tabular form. I should however, in the order of narration, revert to the cases in the infirmary, which I did not think it prudent to visit, before we had finished our task with respect to the healthy children.

I found, in Mitchell's case, that the disease, though very severe, and quite unmodified in its character, was pursuing its course without any aggravation of symptoms. His pulse continued moderate in its action, and his skin cool: he swallowed without increased difficulty: his bowels were gently relaxed; and he had obtained some rest during the preceding night. Far otherwise was it in the case of Charles Mogg, in whom a most alarming change had taken place since my last visit. He was now labouring under extreme difficulty of breathing, as if from constriction of the larynx; and felt such a distressing degree of restlessness and anxiety, that he was with difficulty kept in bed. His countenance was bloated, and of a purple hue; and the general colour of the surface of his body and limbs, instead of being florid red, as on the day before, was now of a dusky purple. Under this disturbance of the circulation, the pulse could not be distinctly felt or counted. His motions, which were passed frequently and involuntarily, were dark-coloured and watery, and his urine was tinged with blood.

Means were immediately directed for relieving the sufferer; whose aspect seemed rather to be that of the victim of a malignant plague, than of any disease occurring in the ordinary course of nature in this country. Before these could be effectually applied, he breathed his last, in great agony, at half past four o'clock.

Two more cases appeared in the infirmary this day; namely, that of a lad, William Banton, and of a girl, Mary H. Webster, both about 15 years of age. Banton had a very white furred tongue: his pulse

was 120, and full. He complained of nausea, pain in the epigastrium, headache, and general indisposition. An erythematous eruption, which might have been mistaken for scarlatina, had not the cases which had already occurred demonstrated its nature, appeared over the whole surface of his skin; and his eyes glistened with that peculiar brightness which, with redness of the tarsi, seems to me very characteristic of variolous disorder. He had not any soreness of the throat. Mary Webster complained of headache, nausea, and pain in the epigastrium: her pulse was 110: her tongue whitish: she had no sore-throat: her countenance was suffused: her eyes heavy; and erythematous patches appeared on the back of her arms. Both these individuals were marked with cicatrices, the remains of former vaccination. Regarding their cases as those of incipient small-pox, under the peculiarity with respect to erythema, which had now manifested itself in all the cases that had occurred, I accepted, with the concurrence of the principal of the establishment, Mr. Wheeler's offer, on the part of the Small-pox Hospital, to receive them, as well as Mitchell, into that Institution. This measure seemed desirable, on account of the healthy children; from whom it was, of course, an object to remove, as far as lay in our power, the sources of contagion.

In consequence of the removal of Mitchell, Banton, and Webster, I no longer attended them professionally; but I can state, both from having visited them on several subsequent occasions, and on the high authority of Dr. Gregory, that Mitchell went through the regular small-pox, without any modification, yet with no remarkably urgent symptoms, considering the quantity of the eruption. In the latter stages of the complaint, he suffered from superficial abscesses; but not to such a degree as to interrupt the progress of his recovery, which was complete.

William Banton grew materially better on the day after entering the Small-pox Hospital. His feverish indisposition, in fact, gradually subsided; and by Saturday the 1st of March he was convalescent. On this day, the rash had faded so as to be scarcely distinguishable on the face, though it was still visible on his chest and extremities. Both the rash and all signs of indisposition left Mary Webster on Friday the 29th: she had, in fact, been more slightly indisposed than the rest; though still, when considered with reference to the other cases, sufficiently affected to justify, in my opinion, the belief that her disorder was of a varioloid character.

On examining the body of Charles Mogg, forty hours after death,

the viscera in general were found in a congested state : this was particularly the case with the lungs, the intestines, the liver, and the spleen, which all seemed as if injected with fluid blood. The only seat of particular disease, however, was the lining membranes of the larynx, trachea, and bronchi, which latter were morbidly vascular, as far as the minuter ramifications of the bronchial tubes. Time did not seem to have been afforded for the production of any more-advanced products of inflammation, excepting in the larynx itself, where we found, behind the thyroid cartilage, two oblong spots of ecchymosis, each about the size of a horse-bean ; and I doubt not that the same irritation which produced these spots was the immediate cause of death. The rima glottidis was not narrowed by any infiltration or thickening of the parts which form it ; nor was there any mechanical obstruction sufficiently great to cause strangulation.

On considering the above cases, it will, I think, appear to others, as it has to myself, that they were but degrees of the same disease. At the commencement, they did not very materially differ from each other : all were affected, though not perhaps quite in an equal degree, with general fever, headache, nausea, and pain in the epigastric region. In all were these ordinary symptoms of incipient small-pox, accompanied by an erythematous eruption, bearing a general resemblance to that of scarlatina or measles, but without the sore-throat of the one, or the semilunar papular clusters of the other. In the case of Mary Webster, the erythema was partial, appearing only in patches on the extremities. In William Banton's case, it was general, and was the only symptom of the disorder which remained after the feverish indisposition had subsided. In Mitchell and Mogg, it has been described as forming a very marked character of their disorder ; disappearing, indeed, in the former, as the pustules advanced ; but in the latter, seeming to take their place, and, as it were, to suppress their effort to germinate. Thus I conceive that the four cases have accidentally furnished examples of four degrees of variolous disorder, each connected with the rest by the erythema which was common to all.

One author, M. Hedlund, has been brought to my notice by Dr. Gregory ; and this gentleman, whose extensive reading on this subject enables him to speak with certainty, informs me, that he knows but one, who has noticed a varioloid fever occurring without consequent pustular eruption, as in the cases of Banton and Webster. The following is M. Hedlund's account, as given by Majendie, in his Journal

de Physiologie, tom. VI. pp. 131, 132 : “ Dans les rapports des Médecins de Province, adressés au Collège Sanitaire de Stockholm, il y en a un de M. Hedlund, à Hernöesand, portant que, lorsque la petite vérole se manifesta dans ce pays, il y eut trois affections différentes ; mais, pendant les premiers jours, elles présentèrent des symptômes tellement semblables, qu’on ne pouvait les distinguer : c’était la petite vérole, la varioloïde, ou une fièvre sans éruption. Cette fièvre, qui se déclara en même temps que l’épidémie, et qui cessa avec elle, ressemblait parfaitement, pendant les trois premiers jours, à celle qui se manifeste avant l’éruption de la petite vérole ; mais elle cessait le quatrième jour : c’est, selon M. Hedlund, une véritable petite vérole avortée : la peau ne présente aucune espèce d’éruption. Peut-être, dit-il, la petite vérole a-t-elle le pouvoir de former une constitution épidémique qui influence les autres maladies régnant en même temps. Le nombre de ceux qui furent atteints de cette fièvre sans éruption était le tiers de ceux qui furent atteints de la maladie sous les deux autres formes.”

It does not appear that in the “fièvre sans éruption,” which Mr. Hedlund describes, there was any erythema of the skin. This affection is not uncommon, as precursory of an eruption of small-pox, and I believe has been remarked more frequently of late than formerly ; but I am not aware that it has been observed, as in William Banton’s case, to supply altogether the place of pustular eruption. Be this as it may, it is a symptom to which it seems proper to draw the attention of medical men ; since it may lead to an erroneous diagnosis, and thus perhaps prevent the adoption of such precautions as might obviate the extension of so serious a disease.

I proceed to exhibit the result of the re-vaccination of the children of the Asylum.—See the following Table.

A TABULAR VIEW OF THE EFFECTS OF RE-VACCINATION, IN 230 CASES, AT THE ASYLUM FOR THE DEAF & DUMB.—29th Feb. 1828.

NAME.	AGE.	Former Small-Pox, or Cow-Pox.	Consequent Cicatrix.	Appearance of the Punctures on the 5th Day.	Eighth Day.	* Eleventh Day: \times and State of Cicatrices Seven Weeks after Re-vaccination.
John Summers	10	inoculated	good on right-arm	Ten spurious vesicles, with ample areola.	The vesicles surrounded by extensive areola, with general tension, redness, and tenderness of the upper arm.	All the vesicles have scabbed: the tension and tenderness have subsided. A general blush of redness still surrounds the points of vaccination. \times Ten permanent cicatrices.
Charles F. West	19	vaccinated	evident	Three elevations	Scabs have formed, which have evidently matured.	Three well-defined small dry scabs. \times Three permanent, but minute cicatrices.
William Gordon	15	vaccinated	large	One small vesicle	The vesicle has scabbed, surrounded by a narrow areola.	The scab has dried, and the areola has disappeared. \times One scarcely-visible cicatrix, which probably will not be permanent.
J. Hamilton	35	small-pox	.....	.....	.....	Two full vesicles, without areola. Lymph very abundant and transparent. \times Two large cicatrices, probably permanent
H. B. Withers	19	nat. small-pox	none	One elevation	A slight elevation remains	A vestige only of the elevation. \times No cicatrix.
James Norris	13	small-pox	none	One vesicle	A perfect vesicle, without areola ..	The vesicle fell, and without areola. Lymph very abundant, and tolerably transparent. \times One moderate-sized permanent cicatrix.
William Eagle	11	vaccinated	slight	One elevation	One imperfect vesicle, with slight areola.	A scab partially formed, with matter at the edges. \times One minute cicatrix.
James Purdue	9	Ditto	evident	Two spurious vesicles	Two subsiding vesicles, one containing pus.	Two scabs, nearly dry. \times No cicatrix remaining.
Charles Berridge	10	Ditto	three marked	Seven vesicles, with areolæ.	Seven scabs have formed Areolæ growing faint.	Scabs quite dry Areolæ still slightly visible. \times One permanent cicatrix, four others still visible.
Benj. Walker	12	Ditto	two large	Four vesicles, with areolæ.	Red elevations remain, with irregular and faint areolæ	One large dry scab, and three small. \times No cicatrix. Scars from the lancet still remain.
Edmond Banton	10	Ditto	one large	Small vesicles over all the punctures.	Punctures remain, elevated with slight areolæ.	One dry scab: areolæ almost gone. The other elevations nearly subsided. \times Eight lancet-scars visible. No cicatrix.
William Cordy	14	vaccin. twice, & afterwards inn. inoculated	well-marked	Three vesicles, with areolæ.	Three spurious scabs, with areola.	Three dry scabs. Small faint areolæ remaining. Two cicatrices, probably permanent.
F. Greville	14		distinct	Four vesicles	Four tolerably well-formed vesicles, inclined to effloresce.	Two drying pustular vesicles, fully matured. \times Two punctures, covered with irregular scabs, slight areolæ surrounding each. \times Three decidedly-permanent cicatrices.
Richard Atkins	14	Ditto	one	One slight elevation	Elevation puckered and subsiding, with slight areolæ.	Elevation drying with areola. \times One small, but permanent cicatrix.
E. Evans	13	small-pox	none	Two elevations	One spurious vesicle, small and indistinct.	A small scab has formed. \times Two cicatrices, probably permanent.
Samuel Aldum	13	neither	none	Three elevations	Subsiding, without scab.	
Edward Waters	14	vaccinated	visible	All the punctures elevated.	The elevations have subsided.	
H. E. Dobson	10	small-pox	two distinct	One elevation	Subsided.	
A. Webb	14	vaccinated	one	Ditto	Ditto.	
John Lovegrove	15	Ditto	two distinct	One slight elevation	Ditto.	
John Henson	13	Ditto 1824	two distinct	One small elevation	Ditto.	
James Mant	10	small-pox	doubtful	Two irregular vesicles, with slight areola.	Ditto.	
William Pinfold	11	vaccinated	small	One elevation	Ditto.	
William Saunders	11	Ditto 1819	distinct	Several slight elevations ..	Ditto.	
John Cousens	11	inoculated	distinct	Two large elevations	Subsiding.	
William Leach	9	vaccinated	obscure	One irregular elevation	Elevation subsiding, with a small thin scab.	
B. B. Wadham	12	Ditto	distinct	All the punctures elevated.	Subsided	
Richard Tabrett	10	Ditto	visible	Punctures elevated	Two-subside elevations.	
James Faithful	13	Ditto	none	Ditto	Subsided.	
S. Butcher	13	Ditto	obscure	Ditto	Ditto.	

Mr. Scolfield	16	Ditto	.....	One irregular vesicle, with areola.	The vesicle has scabbed. The vesicle is disappearing.
Master Murray	10	Ditto	.....	Ditto.	Ditto.
Ann Stokes	14	Ditto	Punctures slightly elevated.	Subsided.	
M. Lumley	13	Do. Dec. 28, 1815	Two punctures elevated	Ditto.	
Cath. Brammer	16	Ditto	One elevated puncture	One irregular scab, with slight areola.	Dry scab. × One cicatrix, probably not permanent.
Catherine Wright	6	Ditto Oct. 1817	Ditto	One vesicle, with a central depression and areola.	Vesicle drying, still containing lymph, and surrounded by areola. × One permanent cicatrix.
Mary Harman	12	Ditto March 1817	One vesicle	Three vesicles, with marked depressions and areola.	Three well-formed vesicles, almost scabbed, but still containing lymph. × Three decidedly permanent cicatrices.
Dinah Edwards	15	small-pox	Two elevated punctures	Elevations matured, with slight areola.	Scabs have formed. × No remaining cicatrix.
Elizabeth Evans	14	vaccinated	Three vesicles	Three small scabs, with slight areola.	Three dried scabs. × No remaining cicatrix.
Sarah Phillips	12	Ditto	Six punctures elevated	Six vesicles perfect, as if she had never been vaccinated.	Six genuine vesicles, still containing abundance of lymph. Beginning to dry. × Six permanent cicatrices.
Caroline Williams	14	Ditto	One elevation	One small indurating vesicle, with slight areola.	One minute scab, with very slight areola. × No cicatrix.
Mary Aldum	14	Ditto	Three elevations	Subsided.	
Elizabeth Tobin	12	Ditto	One elevation	Ditto.	
Sophia Crook	13	Ditto	Two elevations, with areolæ	Two elevations, with areolæ	Two minute scabs, with very slight areolæ. × One very small cicatrix, of doubtful duration.
Martha Miall	12	Ditto	Two elevations	Subsided.	
Eliza Marchment	12	small-pox	One elevation	An irregular vesicle, drying, with slight areola.	A well-formed scab. × One permanent cicatrix.
Mary A. Cockbill	13	vaccinated	Two elevations	One full, but ill-formed vesicle, with areola; the other scabbing.	Two vesicles, nearly dry. × Two small but permanent cicatrices.
E. W. Osman	12	Do. 6 yrs. since	Two slight elevations	Subsiding	
Sarah Moore	12	Ditto	Three elevations	Ditto	A minute scab. × No cicatrix.
Ann Bell	12	small-pox	One elevation	One perfect vesicle	× One cicatrix, probably permanent: another obscure. The vesicle still perfect, and beginning to dry; but without areola. × One permanent cicatrix.
Mary Morgan	13	vaccinated	Ditto	Subsided.	
Caroline Sampson	11	confluent	Two slight elevations	Two perfect vesicles, with depression.	Two perfect vesicles, in a drying state, without areola. × Two large and permanent cicatrices.
Mary A. Butler	11	small-pox	One elevation	One vesicle drying	One dried scab. × One cicatrix, permanent, but small.
Hannah Leach	13	vaccinated	Three very slight elevations	Subsiding	Two perfect vesicles drying, without areola. × No cicatrix.
Sarah Dowers	11	small-pox	.....	.....	A perfect vesicle; no central depression, nor areola.
Jane Griffiths	11	Ditto	.....	.....	× One cicatrix, probably not permanent.
Eliza Cook	11	vaccinated	.....	.....	Two pretty-perfect vesicles, containing lymph in abundance. Evident areola. Not yet perfectly desquamated.
Martha Martain	12	small-pox	.....	.....	A well-formed vesicle, without areola. × Cicatrix probably not permanent.
Sarah Oxley	11	inoculated	.....	.....	A perfect vesicle, full of lymph. × One permanent cicatrix.
Louisa Westbrook	14	vaccinated	.....	.....	One scab, with areola. × Two permanent cicatrices.
Miss Lennox	11	Ditto	.....	Two pretty-perfect vesicles, with areola.	The vesicles full of lymph; areola fading.

Years of age.		Years of age.	
Girls,	Boys,	Girls,	Boys,
4	9	4	9
1	3	1	6
1	6	1	10
1	10	1	11
3	25	3	25
6	25	6	25
9	16	9	16
10	11	10	11
11	4	11	4
12	100	12	100
13		13	
14		14	
15		15	
16		16	
Re-vaccinated without effect		In the whole Establishment	
63		162 had been vaccinated.	
		68 had been inoculated, or had had natural Small-pox.	

* N.B. Crosses are placed in the last column, to distinguish the appearances on the 11th day, from those of the cicatrice after 10 weeks.

I annex, by way of appendix to this table, an account of the re-vaccination of three of my own children; whose cases may perhaps be considered to possess some interest, not only from the certainty of my information regarding their former vaccination, but likewise from the considerable effects which followed the adoption of this measure.

Of these, William and Stephen, twins, were born in June 1820; and Arthur in October 1821.

The former were vaccinated by Mr. Charles Aikin, at the public establishment in Broad Street, when about two months old.

The latter, at about the same age, by the late Dr. Babington, from a healthy little relative, who had been vaccinated by Mr. Aikin.

On the seventh of March, 1828, they were all re-vaccinated, at the Small-pox Hospital, by Mr. Wheeler. The twins were both made sick and faint by the operation, or rather, perhaps, by the dread of it; and one of them, William, vomited copiously: Arthur felt no such effect.

Case of William ———. On the third day, four small elevations were apparent: on the sixth day, four tolerably well-formed vesicles, somewhat depressed in the centre, and surrounded by an areola, which had an erysipelatous character, being studded, on close inspection, with very minute vesicles. Glandular enlargements on each side of the neck took place, apparently in consequence of the local irritation. On the eighth day, four scabs, of a resinous appearance, had formed, and the areola was fading. The glandular enlargements continued on the neck, which was stiff and painful on motion. On the eleventh day, some slight redness remained around the scabs, which were dry, and in a day or two fell off.

Case of Stephen ———. On the third day, three elevations appeared, somewhat larger than in the former case. On the sixth day, these elevations had become vesicles, irregular in form, and puckered towards the centre: two of them were beginning to scab. They were surrounded by an erysipelatous areola: some pain was felt in the axilla; and a small painful glandular tumor was perceptible above the clavicle. On the eighth day, three resinous scabs had formed, the areola around which was fading. The glandular enlargement on the clavicle continued more painful, and the neck more stiff. On the eleventh day, the scabs remained, but all inflammation had subsided.

Case of Arthur ———. On the third day, nine elevations, more inflamed than those of his brothers, made their appearance; and a narrow areola already surrounded each. On the sixth day, six of the punctures had advanced to the state of vesicles, filled with clear serum: these were irregular in form, and were surrounded by an equally irregular angry areola, beset with very minute erysipelatous vesicles. Some headache and slight feverish symptoms had been felt for the last two days; and the child complained of pain in the axilla, where the glands might be felt somewhat enlarged. Lymph was taken this day from the vaccinated arm, and was inserted into the other.

On the eighth day, the six vesicles had increased in size, and the areola had become generally extended; so that the whole of the upper arm was red, inflamed, and swollen, as well on the inner as the outer side; the fore arm was also somewhat enlarged by œdematous swelling.

Repeated fomentations were applied; and on the following day the general inflammation was much abated.

On the tenth day, the swelling and inflammation in the arm had diminished: the vesicles were much elevated; and a brown scab was forming in the centre of each. No effect followed the vaccination of the other arm. On the eleventh day, the swelling of the arm, and all trace of areola, had subsided. A brown scab nearly covered each vesicle, but their edges remained hard and horny. It was not until several days afterwards that the crusts fell off.

After the general re-vaccination at the Asylum, above recorded, not another case of small-pox or varioloid disorder occurred; which leads me to consider the probability that this result was the consequence of the measure adopted. It has been stated, as the opinion of medical men who have the best opportunities of forming correct estimates, that, at this time, one in five of those who have been vaccinated in infancy take small-pox afterwards*: and were this proportion to be adopted, out of 161 boys who had been vaccinated, 32 should, on exposure to the contagion of small-pox, have caught the complaint; and of the girls a somewhat similar proportion. It is not however necessary to adopt an estimate at all approaching this, to perceive that four cases would fall far short of the number likely to be affected. If, in a large establishment of children, a contagious disorder were to break out, we should expect that the cases would occur through an interval of at least ten days. Such was the case last year at the Asylum for the Deaf and Dumb, when the scarlet fever made its appearance. It would also be reasonable to suppose, that the greatest number of cases would happen towards the middle period; because, between the shortest and longest intervals at which a contagious disorder can shew itself in those exposed at one time to its contagion, the medium would be that on which the greatest number of cases would be likely to occur. On the present occasion, one person was on a certain day sent to the Infirmary; one the next; and two the third. As far as any inference can be drawn from such slender data, it seems probable, that had there been no disturbing cause, more cases would have occurred on the fourth day.

Again; we come to the same conclusion, from the appearances on the arms of those re-vaccinated. In nearly 70 instances, out of 230, the vaccine disorder took some effect; and it seems likely that, in those cases, there was an increased risk of taking small-pox. The question, it is true, is only one of probability; but this is so great, as to produce conviction, in my mind, that several persons were, in this instance, saved from small-pox by re-vaccination. I therefore, with confidence, recommend those who have only once been vaccinated to have the operation repeated, after an interval of a few years. If vaccination does not, without this repetition, prove a perfect safeguard, it is, at most, but a slight additional trouble to adopt the precaution. The risk of the operation may be fairly considered as so trifling, that it need not be estimated.

* It is Dr. Eichhorn's opinion, as quoted by Rayer, that, among all who have been vaccinated up to the present time, not more than the half have been protected from all attack, slight or severe, of small-pox.

In Mr. Wheeler's mode of operating, I have stated that ten punctured abrasions are made, which I believe to be an unusual number: and since every puncture, where the disorder takes effect, becomes a centre of inflammation, greater constitutional disturbance might be expected to result, in proportion to the greater number of centres of inflammation. Yet in only one instance in the Asylum, namely, that of John Summers, could any unpleasant consequences be said to follow the operation; and these were not felt after the eleventh day. John Summers, moreover, is a boy of a highly scrofulous habit; and there are unfortunately many examples of a similar state of constitution in the Asylum: so that, in any operation performed on its inmates, there would be more than the average chance of producing ill effects.

Other considerations will perhaps suggest themselves to medical men, on examining the table. I cannot omit adverting to one, on which it is painful to reflect: I mean, the proportion of children in this establishment—and I know no reason why the same proportion should not prevail generally among the lower classes—who have been subjected to inoculation for small-pox. It appears, that, out of 226 children, 65, or more than a fourth, have been inoculated. While this practice is so prevalent, it is in vain to expect those happy results in this country, which have been obtained in other parts of the world by vaccination.

It remains to give some account of the lymph collected from the arms of a few of those who seemed to have passed through the disorder most completely.

From J. Hamilton, one of the teachers, a robust man of 35, who had no appearance of cicatrix, and who says he had small-pox when a child, Mr. Wheeler took lymph from a very fine vesicle, on the eighth day, with which he vaccinated the arm of a healthy child, without effect. The same failure occurred, in two instances, with lymph from the arm of my youngest son, whose case has been detailed.

A contrary result occurred in the case of Ann Bell, who was vaccinated among the rest, though it appeared, from her certificate, that she had had the small-pox. By a reference to the table, it will be perceived that a very perfect vaccine vesicle resulted from her re-vaccination; and from this, lymph was taken on the eighth day, with which Mr. Wheeler vaccinated Adolphus Palmer, an infant eight months old, in the left arm: at the same time, he inserted lymph, from a desirable source, in the right arm. On the sixth day of vaccination, six very fine vesicles appeared on the left arm: they were in perfection on the ninth day; and scabbed, in the usual manner, on the fifteenth. When compared with the right arm, the vesicles maintained, throughout, exactly the same appearance. I myself saw the child on the ninth day; and, excepting that the vesicles on the left arm were rather the larger, I could perceive no difference.

From James Norris, whose case will be found in the table, and whose certificate affirms him to have had small-pox—which indeed is evident from the appearance of pits in his face—Robert Havill, an infant four months old, was vaccinated in the right arm: he was vaccinated in the left arm, at the same time, with genuine lymph. On the fifth day, several fine vesicles appeared on both arms; and on

the eighth day seven vesicles appeared on the left arm, and three on the right: the latter were perfect, but not quite so large as the former. The child went regularly through the disorder.

The facts recorded in the two last paragraphs namely, that a perfect vaccine disorder, capable of propagation, was established in two individuals who had had small-pox, being highly interesting, I thought it worth while to take great pains in ascertaining whether Anne Bell and James Norris had really been the subjects of small-pox. The parents of the former I saw at Romsey in Hampshire; and I corresponded with the medical man who signed the certificate of the latter. In both instances, I satisfied myself, beyond all doubt, that the individuals had, in confirmation of their certificates, formerly had that disease.

The preceding account of the re-vaccination at the Asylum for the Deaf and Dumb, in 1828, was drawn up soon after it was performed: and as the cases which suggested this course presented peculiarities, it was thought worth while to give them with some minuteness of detail.

On the 27th of April 1833, after an interval of more than five years, in the course of which, the establishment had, with the exception of the teachers, altogether changed its inmates, the small-pox again made its appearance, in two well-marked cases; namely, that of Elizabeth Ferraro, a girl of 16, who had been vaccinated, and exhibited one cicatrix in her arm; and of Elizabeth Creed, a girl of ten years of age, whose certificate affirmed her to have had small-pox.

The former, contrary to my wish, was taken home by her friends, as soon as the disorder became manifest; and had it severely, though without particular danger. The latter was sent to the Small-pox Hospital, where she passed through the disease, in a mild, but unequivocal form.

On the 1st of May, all the children were re-vaccinated by Mr. Wheeler, from fresh lymph, as on the former occasion; and the adjoining table records the results. One case, and one alone, occurred after the adoption of this measure. Susan Shefford, 12 years of age, who was certified to have been vaccinated, and had two distinct cicatrices on her arm, was re-vaccinated, among the rest, but without effect. On the 4th of May she sickened with small-pox; and being sent to the Small-pox Hospital, went through the disease there, in a severe, and, I believe, unmodified form: this, at least, I infer, as well from the account of one of the female teachers who visited her during her illness, as from the present appearance of her face; which, after a lapse of two years and a half, exhibits numerous very distinct, though small, cicatrices.

TABULAR VIEW OF THE EFFECTS OF RE-VACCINATION, IN 213 CASES, AT THE ASYLUM FOR DEAF & DUMB.—May 1, 1833.

NAME.	AGE	Former Small-Pox, or Cow-Pox.	Cicatrix.	Appearance on Fifth Day.	Eighth Day.	Eleventh Day.	Seventeenth Day.
William Savill	14	vaccinated	.....	Irregular inflammation, with imperfect vesication.	Spurious vesicles, with extensive areola, and considerably elevated base.	Scabbing, the areola subsiding,	Scabs falling off.
Robert Stevens	16	vaccinated	distinct	Three vesicles	Three perfect vesicles	Vesicles beginning to scab	Scabs fallen off, excepting one: cicatrices left.
D. Smith	16	small-pox vaccinated	none	Five good vesicles	Five perfect vesicles	Vesicles scabbed	Cicatrices perfect.
A. Dunley	16	vaccinated	distinct	Two irregular vesicles	Vesicles dry	Vesicles scabbed	One scab still adherent.
John Hymass	16	vaccinated	distinct	Two fair vesicles	Vesicles drying, with slight surrounding redness.	Two small scabs	One scab, one cicatrix.
W. Bradbrook	13	small-pox	none	General elevations, with slight redness.	Four vesicles perfect, but small, red, and with areola.	Minute scabbing	Scabs still adherent.
P. Hancock	15	inoc. small-pox	good	Two elevations	Two vesicles	Two scabs	Two slight cicatrices.
J. Chappell	15	inoc. small-pox	distinct	Five elevations	Five vesicles	Scabbing, with areola	Three irregular cicatrices.
J. Boff	13	small-pox	none	Two vesicles	Two vesicles	One minute scab	No trace left.
A. Fields	15	vaccinated	2 very distinct	One elevation	One spurious vesicle	One minute scab	Scab still remaining.
J. Waterford	13	.....	distinct	Elevated, with redness	Spurious vesicles, with broad areola.	Vesicles still apparent; one whole, three injured	Four scabs still remaining.
S. Moore	15	inoculated	distinct	Three vesicles	Vesicles advanced, but now drying.	Three small scabs	No trace left.
F. W. Cook	14	.....	none	Two vesicles	Two good vesicles	Vesicles drying, but perfect ..	Two cicatrices.
James Morgan	15	vaccinated	distinct	Two elevations, with redness.	Spurious vesicle drying	Irregular scab	No trace left.
George Goodman	14	small-pox	none	Two vesicles	Two spurious vesicles	Vesicles scabbing	Two perfect scabs.
James Whitfield	12	vaccinated	distinct	Ten elevations	Spurious vesicles, with areola ..	Five small scabs	Faint cicatrix.
	14	.....	two distinct	Elevated	Spurious vesicles, advanced, and drying.	Three small irregular scabs ..	One large cicatrix, two small.
William Simmons	12	vaccinated	none	Full vesicle	Spurious vesication .....	.....	No trace left.
George Bishop	12	vaccinated	two distinct	A vesicle	Spurious vesicle	A scab, with redness	One cicatrix.
Thomas Grange	14	vaccinated	distinct	Vesicles	Spurious vesication	Irregular scabs	Faint cicatrix.
J. Livermore	13	.....	distinct	Two good vesicles	Two spurious vesicles, drying ..	Two small scabs	Two cicatrices.
G. A. Staples	12	inoculated	distinct	One doubtful elevation	One spurious vesicle	Scab, with areola	A large cicatrix.
Henry Howard	13	small-pox	none	Three vesicles	Vesicles continue	Three fine vesicles advanced ..	Two cicatrices, one scab.
James Cutler	13	vaccinated	distinct	Slight elevation	Spurious vesication	Irregular scabs	One scab, one cicatrix.
Robert Plummer	13	vaccinated	two distinct	One slight vesicle	Vesicle, with redness	One scab	One cicatrix.
J. Newport	13	vaccinated	distinct	One vesicle, with slight redness.	Slight scab	Scab remaining	No trace left.
L. Cohen	13	vaccinated	distinct	Two vesicles	Two vesicles, with areola	Two slight scabs	No trace left.
F. Sanders	11	vaccinated	distinct	Elevation, with redness	One spurious vesicle, with areola ..	Two irregular scabs	Scabs remaining.
J. Marshall	11	vaccinated	distinct	No effect	One small vesicle	Vesicle scabbing, with small areola.	Cicatrix.
D. Bawen	11	vaccinated	distinct	Slight elevation	One small spurious vesicle	One small scab	No trace left.
T. P. King	12	.....	distinct	One vesicle	One small scab	Scab remaining	No trace left.
James Nunn	12	small-pox	distinct	Slight elevation	Slight scab	Scab remaining	No trace left.
William Austin	12	vaccinated	distinct	One perfect vesicle, two elevations	Three fair vesicles, with areola ..	Vesicles scabbing, areola disappearing.	Three perfect scabs.
J. Dansie	13	vaccinated	distinct	Imperfect vesicles advanced ..	Scabs	Scabs remain	No trace left.
Robert Thompson	12	vaccinated	distinct	Two vesicles	Two fine vesicles	Vesicles scabbing	A double cicatrix from

William Brown	12	vaccinated	none	Four vesicles.....	elevation.	Vesicles continued.....	ing, with redness.	Five cicatrices.
G. Smith	11	vaccinated	indistinct]	Elevation		Five good vesicles	Vesicles scabbing.....	Five scabs.
H. P. Hayworth	11	inoculated	two distinct	Two vesicles		One spurious vesication	One small scab	No trace left.
C. Baker	12	vaccinated	none	A vesication		A scab.....	Minute scab remains	No trace left.
G. R. Woodcock	12	vaccinated	none	One good vesicle		One spurious vesicle, with slight areola.	An irregular scab	Scab still on.
Joseph Fuller	12	vaccinated	distinct	Two elevations		Two spurious vesicles.....	Two small scabs.....	No trace left.
R. Petchell	15	vaccinated	none	One good vesicle		Vesicle drying	Imperfect scab	One small scab.
C. J. Thornton	9	vaccinated	distinct	Spurious vesication		Spurious vesication, with areola...	Five small scabs.....	Five very small cicatrices.
William Bousfield	12	vaccinated	distinct	Two vesicles, with areola...		Two vesicles, scabbing.....	Two small scabs.....	No trace left.
J. T. Cherry	9	vaccinated	distinct	One slight elevation		One vesicle.....	Vesicle scabbing.....	One scab.
E. Lewis	10	vaccinated	distinct	One vesicle.....		One spurious vesicle.....	Imperfect vesicle, scabbing....	Scab remaining.
W. T. Taylor	11	small-pox	distinct	One slight elevation		One vesicle broken	A scab.....	Slight cicatrix.
A. R. Allsop	16	small-pox	none	No visible effect.....		One vesicle, with slight areola drying.	Nearly gone.....	No trace.
M. A. Cormack	16	small-pox	distinct	Good vesicles		Seven vesicles in perfection	Vesicles small, but scabbing....	Several cicatrices.
E. Bartholomew	13	vaccinated	distinct	Good vesicles		Four perfect vesicles.....	Vesicles scabbing in the centre.	Four perfect scabs.
E. Hutchinson	13	vaccinated	distinct	Large vesicles, with areola..		Spurious vesicle drying, with areola.	Small scabs	No trace.
M. E. Caddell	14	vaccinated	distinct	Elevation.....		Spurious elevation advanced	Subsiding	No trace.
C. Vaughan	15	small-pox	none	One elevation		One spurious vesicle, with areola.	Vesicle scabbing.....	No trace.
E. Edmonson	15	vaccinated	none	One vesicle.....		One spurious vesicle, base slightly red.	Vesicle still apparent	No trace.
E. Webley	15	Inoculated	distinct	An elevation		One slight vesicle.	Vesicle still apparent	One cicatrix.
Mary Cook	13	vaccinated	none	Elevation		One spurious vesicle.....	Vesicle scabbing, irregular ...	Very slight cicatrix.
E. S. Jameson	14	Inoculated	very distinct	One vesicle		One spurious vesicle, drying	One small scab	No trace.
M. Piper	12	small-pox	no mark	Vesication.....		Four perfect vesicles.....	Irregular vesicles, scabbing....	Several irregular cicatrices.
E. P. Richards	14	.....	distinct	Vesication		Four spurious vesicles, with redness.	Four minute scabs.....	No trace.
Maria Mastin	12	vaccinated	distinct	Vesication		Spurious vesications, with areola .	Scabs	Minute scabs.
E. T. Chesterman	13	vaccinated	distinct	Vesicles, with areola		Eight vesicles, with slight areola drying.	Five vesicles have scabbed, two still full.	Minute scabs.
C. Creed	11	small-pox	none, face pitted	Elevation		Spurious vesicles, with areola dry-ing.	One small scab	Cicatrix irregular.
C. Menzies	7	.....	Three distinct	Two elevations.....		One pointed pustule, spurious	Vesicles burst, and scabbing...	No trace.
H. Stone	12	.....	distinct	Vesication, with extensive areola.		Five spurious vesicles, with areola.	A fine vesicle, scabbing	Irregular cicatrix.
M. A. Fellows	11	vaccinated	distinct	One elevation.....		One acuminated vesicle.....	Two scabs	One scab.
J. Hickmans	..	.....	natural pits	Two vesicles.....		Two nearly-perfect vesicles.	Five vesicles perfect, with ex-tensive areola	Two cicatrices.
A. Wood	9	vaccinated	minute	Four vesications.....		Five fine vesicles.....	One cicatrix, four full scabs.	One cicatrix, four full scabs.
S. Battocks	9	vaccinated	faint	One elevation		One spurious vesicle.....	One minute scab	No trace.

The word 'vesicle' is used, in the foregoing table, to signify a portion of cuticle elevated by subjacent lymph, and occupying the spot where a single puncture had been made : but since, according to Mr. Wheeler's method of operating, the punctures were, in each case, ten in number, it happened, in many instances, that, instead of single vesicles, the cuticle was raised in one continuous bleb over several punctures :—the word 'vesication' has been used to designate this appearance. By the word 'spurious' is meant, irregular in shape, and puckered or indented at the base. In fact, such an appearance is indicated, as, if occurring in common vaccination, would lead the practitioner to doubt whether the effect produced would be specific and protecting. The word 'elevation,' used under the heading "5th day," applies to that state of the punctured region prior to the appearance of vesication or vesicles.

In elucidation of this table, we may remark, that of 213 children who were re-vaccinated, there were 86 on whom the operation produced no effect. Of these, 61 had distinct cicatrices on their arms ; 60 of them had been vaccinated ; 11 were recorded as having had small-pox ; 7 as having been inoculated ; and there were 8 without record.

In 41 cases, out of the remaining 127, all appearance of the re-vaccination, though still remaining on the 5th day, had vanished by the 8th ; and in 12 cases more, the effects reached the 8th, but vanished before the 11th day. The remaining 74 cases are placed in the table. Eleven of the children who exhibited evident and numerous pits of small-pox were not re-vaccinated. Out of 224 children, among whom these were included, 18 are marked in their certificates, produced on their admission into the asylum, as having been inoculated ; and 34 as having had small-pox, without its being specified whether naturally or not. Nearly one-fourth of the establishment, therefore, still appear to have been deprived, by their parents or friends, of the protecting influence of vaccination, and, by receiving small-pox, to have been made accessory to the propagation of this calamitous disease.